

# THE POLAR TIMES

FIRST INTERNATIONAL POLAR YEAR



Main building, Fort Conger. From Adolphus W. Greely, *Report on the Proceedings of the United States Expedition to Lady Franklin Bay, Grinnell Land*, Vol. 1 (Washington: Government Printing Office, 1888), front.



# Polar Year began arctic study

Daily News-Miner, Fairbanks

During the first International Polar Year of 1882 and again in 1932, the United States made major contributions to research in the Arctic. This year marks the 100th anniversary of the first International Polar Year.

During the polar years, intensive scientific observation was conducted which largely concerned studies of northern latitudes.

During the first polar year, 12 stations were established by 11 nations in the Arctic for studies of surface weather conditions, geomagnetism and the aurora borealis.

Funding for the Arctic research stations at Point Barrow and Lady Franklin Bay, Canada, came from a direct Congressional approval. The stations were under the jurisdiction of the U.S. Army Signal Corps.

The immediate purpose of the stations was to conduct observation in order to meet International Polar Year objectives. At the time it was hoped

that permanent long term observatories would result.

The leader of the Point Barrow Station was 1st Lt. P.H. Ray. He and a group of officers, enlisted men and civilians disembarked from the schooner "Golden Fleece" and began setting up the station in the little time that remained before winter.

Captain Hooper, the vessel's master, provided the group with a fine supply of reindeer clothing and tents, which he had collected in view of the possibility

of having to winter in the Arctic.

The first few days' activity were lost by gale force winds. However, the Eskimos helped the newcomers by using their umiaks to bring stores from the ship to the beach and assisted with setting up the station. The observation program was completed in the late summer of 1883 and the party returned safely home.

The American expedition to Lady

Franklin Bay, Ellesmere Island, Canada, was under the leadership of Lt. Adolphus Greeley. Its plans were to spend two years at what is today still one of the most isolated parts of the Arctic. Having missed their relief in 1883, they had to spend a third season in the Arctic. Only six of the original 24 men survived.

Despite the hardship experienced by the participants in the first International Polar Year, valuable scientific information was gained, particularly on the nature of the aurora borealis. What was probably even more significant was the demonstration of the value of long-term scientific observations and observatories to support them.

It was not until 1947 that an Arctic research laboratory was again established near Point Barrow by the U.S. Navy, Office of Naval Research. It was led by Laurence Irving who later became the first director of the University of Alaska, Institute of Arctic Biology.

## Arctic tourists survive icy landing

Associated Press

May 19

**Inuvik, Northwest Territories** — A group of American tourists scrambled to safety from an aircraft at the North Pole during the weekend in time to watch the plane sink through the ice, the general manager of Kenn Borek Air said Tuesday.

Steve Penikett said the seven stranded passengers, who had paid several thousand dollars each for a little adventure, were rescued unharmed

six hours later along with two crew members.

Pilot Rocky Parsons was setting the Twin Otter down on a smooth patch of ice at the pole early Friday when all three wheels broke through, Penikett said from his office in Calgary, Alberta.

"He landed on a lead, which is a crack that has opened and refrozen, giving a smooth landing spot — we've been landing on them for years," Penikett said.

"This one happened to be newly refrozen."

The plane began to sink slowly, the passengers second group was canceled after the accident but the rest of the itinerary, including a visit to an Inuit community and a flight over the North

evacuated with survival gear while the pilot radioed a base camp at Lake Hazen near the northern tip of Ellesmere Island.

Within six hours another Twin Otter had landed at the pole for the rescue and other planes were on the way.

Fourteen Americans were on the tour, operated by a Sobex, a Los Angeles travel firm.

The group flew to Lake Hazen, and half were to go to the pole at a time.

The trip to the pole for the Magnetic Pole, was kept.

The passengers, whose names were not released, were due to land in Resolute Bay late Tuesday but were unavailable for immediate comment while the Canadian

Department of Transport investigated.

This is the seventh summer Kenn Borek Air has been flying the tours.

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### The Polar Times

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## Agency starts arctic studies

Washington — The Interior Department began studies in nine categories in the central arctic area of Alaska during 1981, according to a new report.

The Alaska lands act required the secretary of Interior to study federal

lands in the central arctic area and report to Congress within eight years on the area's oil and gas resource potential, wilderness characteristics and wildlife resources. However, Interior plans to submit its final report in 1985.

The central arctic is described as north of 68 degrees north latitude and between the National Petroleum Reserve and the Arctic National Wildlife Range.



# The Polar Times

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No. 94

JUNE 1982

## Antarctica Yields First Land Mammal Fossil

By ROBERT REINHOLD

The New York Times

WASHINGTON, March 20 — A team of American scientists has just returned from the Antarctic with the fossil remains of the first land mammal ever found there.

The bones, which are those of a small marsupial the size of a rat, constitute compelling evidence for what scientists had long suspected but could never prove: that those pouched creatures, now mostly confined to Australia, reached that continent from South America using Antarctica as a land bridge before the continents separated and drifted apart hundreds of millions of years ago.

"For years and years people thought marsupials had to be there," said the team leader, Dr. William J. Zinsmeister, a paleontologist at Ohio State University's Institute of Polar Studies. "This ties together all the suppositions made about Antarctica. The things we found are what you'd expect we would have."

While previous discoveries of amphibian, bird and reptile fossils in Antarctica have established the theory of continental drift beyond any scientific doubt, no

mammals had been found there until now.

The once widely accepted theory was that marsupials, which originated in the Americas, had migrated to Australia

from the north, through the East Indies. But if Australia, South America and Antarctica were once connected in a single land mass, called Gondwanaland, scientists suspected that marsupials would have used the southern route and that their remains would probably be found in the Antarctic.

The find consists of three inch-long jawbones, each with two or three teeth, that belonged to two berry-eating creatures of an extinct marsupial species called *Polydolopus*. The bones were dated to the Eocene epoch, about 40 million years ago, and were similar to those of marsupials known to have flourished in South America at the time. They were recognized instantly by Dr. Michael P. Woodburne, a vertebrate paleontologist at the University of California at Riverside, who is an authority on marsupials.

The fossils were found on Seymour Island at the northeastern tip of the Antarctic peninsula, which points toward the southern tip of South America. The team chose the island because it is free

of ice and snow in the Antarctic summer and has the right kind of rock for preserving fossil remains. They also found numerous fossils of ancient lizards, giant penguins, bony fishes and plesiosaurs, huge marine reptiles that swam with paddle-like flippers.

The find indicates that South America and Antarctica were still attached in the late Cretaceous and early Tertiary geological periods, or about 65 million years ago. At that time the Antarctic was a lush rain forest, but was soon to begin the long cooling process that has left it a frozen desert today. The last land connection between the continents was cut about 50 million years ago.

Marsupials, mammals that lack a placenta but have a pouch, reigned for 40 million years in North and South America, but the opossum is the only remaining member of the family there today. They are believed to have lost out in the evolutionary sweepstakes to placental mammals, which mature their young internally.

But the marsupial cousins that migrated to Antarctica apparently survived. A major unanswered question is why the placental mammals did not also cross the Antarctic land bridge.

For years, those advancing the continental drift theory held that the Antarctic acted as a kind of migratory filter, passing the marsupial but not the placental mammals, leaving the marsupials isolated and protected when Australia broke off from Antarctica about 55 million years ago.

As Alfred Sherwood Romer, a Harvard paleontologist, once put it, Australia became "a great marsupial-filled Noah's Ark floating northeast across the Indian Ocean, finally to run aground on the East Indies." The new finding appears to confirm that concept.

### A Difficult Task

The tiny marsupial bones were extraordinarily difficult to find among the mass of marine fossils on Seymour Island. The team purposely searched beneath the base of a mesa where they had found sand crab fossils, which indicated that the area was once beach and therefore a place where land animals might be found. The marsupial fossils were found on the surface, just two days before the team was to depart, and Dr. Woodburne identified them by the characteristic shape of the teeth.

The other members of the team were Dr. Rosemary A. Askin, a research associate at the Colorado School of Mines, and Dr. Sankar Chatterjee, a geophysicist at Texas Tech University. The team expects to return next year to continue

## Reagan Backs Antarctica Study

United Press International

President Reagan has affirmed his administration's commitment to conducting scientific research in Antarctica in cooperation with other Antarctica Treaty signers, a White House spokesman announced March 30.

Deputy press secretary Larry Speakes said Reagan has decided the U.S. Antarctica program should be maintained at a level "providing an active and influential presence in Antarctica" to support the range of U.S. interests on the continent.

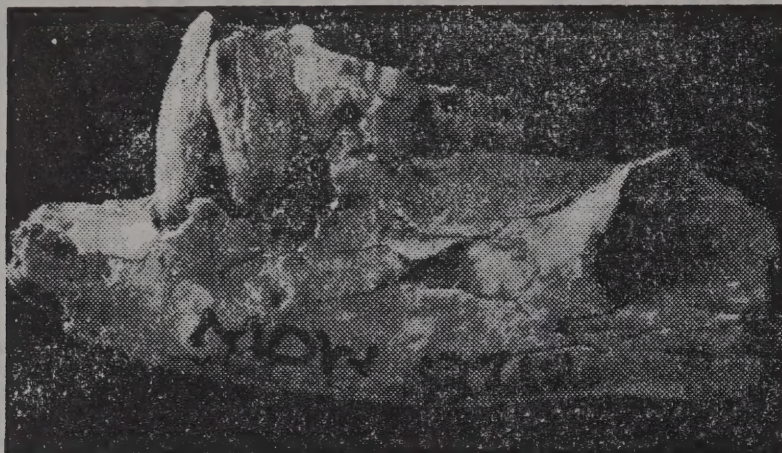
The president also ruled that the U.S. presence should involve scientific activities during the year-round occupation of the

South Pole and two coastal stations. He said the program should be managed in a manner that "maximizes cost effectiveness and return on investment."

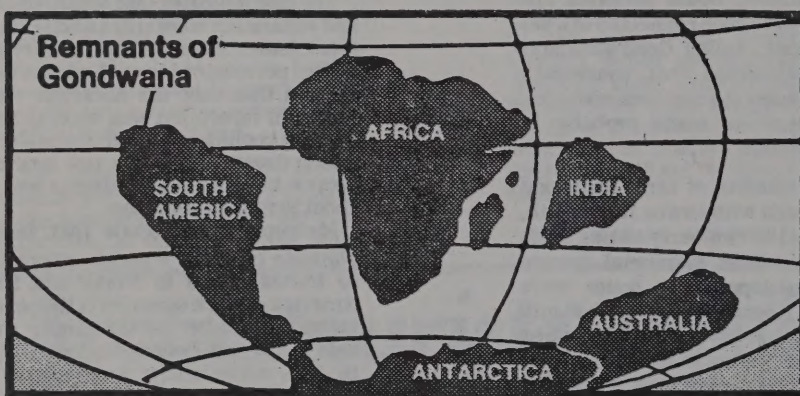
Reagan also decided that the National Science Foundation will continue to budget for and manage the Antarctica program, drawing on other major departments for logistical support.

In another development, Speakes noted the United States has ratified the Convention on the Conservation of Antarctic Marine Living Resources. He said the new agreement, adopted in a diplomatic conference in Australia in May, 1980, is expected to enter into force within the next few months.





A fossil jawbone of a marsupial, three inches long, found in Antarctica.



The New York Times / March 21, 1982

Probable position, 65 million years ago, of fragments of Gondwanaland. Mammals could have passed by land from South America to Australia.

studying the relationship between land and marine life before the glaciation of Antarctica.

The team's work was financed by the National Science Foundation, which manages all American scientific activities in Antarctica. In releasing word of

the find today, officials at the foundation quoted an early advocate of continental drift, Dr. Lawrence M. Gould, who wrote in his book "Cold," published in 1931: "I had rather go back to the Antarctic and find a fossil marsupial than three gold mines."

## 14 Nations in Accord On Antarctic Minerals

WELLINGTON, New Zealand, June 26 (Reuters) — The 14 Antarctic Treaty nations, including the United States, announced today that they had agreed on a preliminary framework for a pact allowing oil-drilling and mining in the region.

Chris Beeby, Assistant Secretary in the New Zealand Foreign Affairs Ministry, announced the accord at the end of a two-week conference by the 14 nations.

Mr. Beeby, chairman of the conference, said at a news conference that the framework covered all aspects of mineral exploitation and the protection of the Antarctic environment.

The treaty countries are Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, Poland, South Africa, the Soviet Union, Britain, the United States and West Germany.

**Q.** What is the definition of wind chill factor, and what formula do meteorologists use to calculate it?

**A.** The "wind chill factor," which is not actually a single factor, is based on the attempted calculation of heat loss from exposed human skin through the combination of particular temperatures and air velocities and involves heat loss from four factors: conduction, convection, radiation and evaporation. (Wind chill also occurs in summer, but then it is called "refreshing breeze.") Wind chill factor is based on improved versions of a formula calculated from experimental observations at the Antarctic base Little America by Paul Siple. That formula is:  $(10 \times [\text{square root of } v] + 10.45 - v) \times (33 - t)$  where  $v$  is the wind velocity in meters per second and  $t$  is the temperature in degrees centigrade. This yields heat loss in kilocalories per square meter from human flesh, which is assumed to be at a tem-

## Polar archivist dies

Gerald Pagano, staff member of the Center for Polar Archives of the National Archives since 1972, died in the early morning of 17 October 1981 in Washington, D.C. Mr. Pagano, 68 years old, had worked in various polar programs for nearly 30 years.

As a member of the U.S. Army (1935-1936, 1940-1965), Mr. Pagano worked with both arctic and antarctic programs. In 1955 and 1956 he was public information officer and adjutant of the U.S. military base in Thule, Greenland. After serving as military assistant to the scientific advisor of the Army Research Office, Office of the Chief, Research and Development from 1956 to 1959, he moved on to become technical information officer of the U.S. Antarctic Projects Office. In 1960, he became assistant plans and operations officer for the U.S. Naval Support Force, Antarctica (1960-1965). Before joining the staff of the Center for Polar Archives in 1972, he was on the staff of the Research Analysis Corporation (1965-1972).

Mr. Pagano was known for his keen interest in and enthusiasm for the polar regions. Because of his dedication and intellectual curiosity many valuable papers by and much information from notable polar specialists have been preserved at the National Archives. A close associate who provided him with an opportunity to become well versed in the history of antarctic exploration was Paul Siple. Because he shared this knowledge with his colleagues and others through his work, he enriched the historical record of polar exploration and research.

In recognition of his contributions to the U.S. effort in Antarctica, the U.S. Board on Geographic Names has named Pagano Nunatak in the Thiel Mountains in his honor.

ANTARCTIC JOURNAL

perature of 33 degrees centigrade. Heat loss must be further transformed mathematically to get the wind chill factor, which is why meteorologists usually look it up in a chart. One such chart can be found in "A Field Guide to the Atmosphere," by Vincent J. Schaefer and John A. Day, published by Houghton Mifflin.



POLARFORSCHUNG  
**110**  
DEUTSCHE BUNDESPOST



# Expedition From India Arrives in Antarctica

The New York Times / Feb. 16, 1982

**A** SCIENTIFIC expedition from India has landed on the coast of East Antarctica. Its stated purpose was to perform oceanographic, seismic, climate and other scientific research on the remote ice-locked continent.

The action, however, inevitably raises political questions about India's ultimate intentions in the Antarctic, which is the focus of mounting international tension over who should control its potential energy and food resources.

The team of 20 Indians landed Jan. 9 on the coast of Queen Maud Land opposite the Indian Ocean, according to reports from New Delhi. Members of the expedition, led by Dr. Zahoor Qasim, a leading Indian oceanographer, went ashore near the Japanese station of Showa at 41 degrees 7 minutes east longitude.

Details were sketchy, but the team was not expected to stay long. It is not known if the Indians plan to install a permanent station. The effort appears to be part of India's growing interest in building its scientific prowess and prestige. Prime Minister Indira Gandhi took a personal interest in the expedition, calling it the "fulfillment of a lifelong dream."

Reports on the expedition have also prompted speculation in Washington that India may be parting company with other underdeveloped countries and may plan to sign the Antarctic treaty, which is dominated by the world's industrialized countries.

The so-called Group of 77 poorer countries, of which India has been a leader in calling for a "new world order," have argued that the Antarctic should be considered part of the "common heritage" of mankind and have expressed resentment against the treaty "club." The common heritage approach emerged in the protracted Law of the Sea deliberations, and the United States and other Antarctic powers are eager to prevent its application to Antarctica.

The 20-year-old treaty suspends all territorial claims to the Antarctic and sets it aside for scientific and other peaceful uses. Intensive negotiations are going on among the treaty powers to establish a regime for the exploitation of mineral resources there, and the treaty's signers are trying to avoid having the United Nations get involved.

## 2 Volcanoes Found in Antarctica

Two small active volcanoes, 30 miles apart, have been discovered in Antarctica, bringing to five the total number known on that continent. The new ones have erupted so recently that their debris blankets part of the Larsen Ice Shelf on the Weddell Sea side of the Antarctic Peninsula.

When Dr. Oscar González-Ferrán, a geologist from the University of Chile in Santiago, sighted the volcanoes in March in a survey by helicopter, one was still steaming. He was participating in the Chilean Antarctic program.

His discovery, reported at a recent meeting of Antarctic scientists at Skyland, Va., was announced yesterday by the National Science Foundation, which finances United States activities in that region. The volcanoes were described as low cones of basalt, a common form of volcanic rock.

One of them, 130 miles east of Palmer Station, the American base on Anvers Island, appears to be a feature previously charted as one of the Seal Nunataks. The Eskimo term "nunatak" refers to a mountain summit protruding above an ice sheet. The other volcano lies 30 miles farther east.

Several less-developed countries, including Peru, Uruguay and Brazil, have recently "acceded" to the treaty, the first step to full membership, which requires demonstration of "substantial scientific research" on the continent.

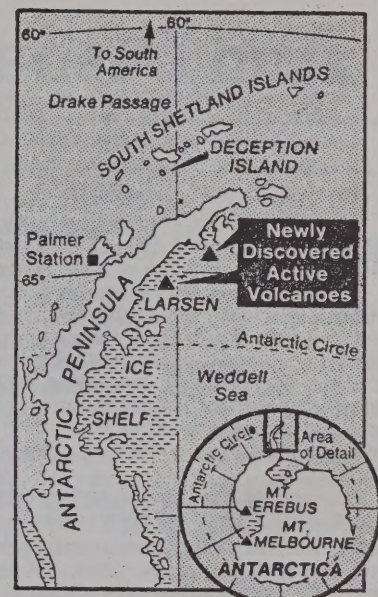
The Indian team left the port of Goa on Dec. 6 after its members, used to India's warm weather, underwent three months of training in the Himalayas. They sailed for three months aboard a chartered Norwegian ship, the 600-ton ice-strengthened Polarsirkel. Though not bound by the treaty, the Indian Government followed its provisions by informing the treaty powers through diplomatic channels.

According to Indian news dispatches, the expedition was particularly interested in studying the effect of Antarctica and its surrounding seas on monsoons in India and in gathering information on krill, the shrimplike animals abounding in Antarctic waters that have been called a major potential protein source.

R. Tucker Scully, head of the office of Oceans and Polar Affairs at the State Department, said he did not know if there was a political motive behind the expedition. But he said, "The United States view is that we encourage them to participate in the treaty."

The 14 full treaty members are Argentina, Australia, Belgium, Britain, Chile, West Germany, France, Japan, New Zealand, Norway, Poland, South Africa, the Soviet Union and the United States.

Robert Reinhold



The New York Times / May 24, 1982

Chilean geologist sighted two volcanoes in March from a helicopter.

The best known Antarctic volcano is Mount Erebus, which rises 13,000 feet from McMurdo Sound. A few years ago it was struck by a New Zealand airliner filled with tourists. There were no survivors. Mount Melbourne, a 9,000-foot peak 235 miles to the north, in Victoria Land, is also active.

The fifth volcano, off the northern tip of the Antarctic Peninsula, is a crater that has been ruptured by the sea to form a circular harbor known as Deception Island. Beginning in the 1820's, it was used as shelter by sealing fleets from New England and later by whalers.

On occasion, water in that harbor has boiled, peeling off bottom paint from the hulls of ships that did not escape in time. An eruption a decade ago damaged research stations established there by both Britain and Chile.

This volcano and the two newly discovered ones on the opposite side of the peninsula, the longest on earth, are thought to be formed by lava released from a southeastward-moving section of the Pacific floor that is burrowing under the peninsula in the same process thought to have formed the Andean mountain system farther north, in South America.

### Mediterranean on ice

Moscow (AP)—Icebergs floating in the world's oceans have a total capacity "equal to the volume of the Mediterranean Sea if it ever froze from top to bottom," Tass, the official Soviet press agency, said. It said the calculation was made by scientists at Leningrad's Institute for the Study of the Arctic and Antarctic.



# Isolation Breeds Strife And Despair at the Pole

By ROBERT REINHOLD

The New York Times / Jan. 12, 1982

**T**HE events of Aug. 17, 1979, will not get into the official history books, but they were something of psychological milestone in the history of the South Pole. Outside, temperatures dipped to 71 degrees below zero in a blinding blizzard, but inside, emotional temperatures among the crew of 16 men and one woman, after nearly half a year of total darkness, were reaching the flash point.

Foaming at the mouth and roaring drunk, a member of the crew who had recently learned of his father's death, piles into the galley in rage. He yells and begins to smash cups wildly. Blood and glass everywhere. Soon he spies his rival for the affections of the station's lone woman and charges with a two-by-four, then runs out into the blizzard. It is hours before the mayhem ends, with gashes, bruises and frostbite.

In the three days of eerie calm that followed, Andrew Cameron, the 22-year-old supply man who witnessed all this, reflects in his diary: "Most people would never winter over if they knew what it really is like. Well the truth of it is that it can be fun at times but the deep dark winter with hopeless evacuation for eight months is a sheer mental hell." He wonders how the crew, afflicted by deep jealousies and divisions, can survive another three months.

Though an extreme example, that night of violence underscores the powerful mental effects of protracted isolation. And many psychologists believe the unusual nature of Antarctic isolation — in which a small group of scientists and support personnel is confined to a tiny life-sustaining cocoon surrounded by an impenetrable hostile environment that permits no quick escape — may hold lessons for an approaching age of prolonged space travel and space colonization.

To judge from the experiences of recent winter crews at Antarctic outposts, there is still much to be learned about human adaptation to these rigors. A major problem has been to learn how best to incorporate women into the previously all-male Antarctic culture. After a recent winter here, one woman required treatment in a mental institution.

"Isolation is a kind of stress — it brings out the best and worst in people," said Dr. Jay T. Shurley, a psychiatrist who spent several years studying the denizens of the South Pole.

Those who have wintered here almost invariably say it was the worst and best year of their lives. They tell of extreme depression, boredom, insomnia, paranoia, sexual frustration. They

also speak of spectacular auroral displays, starlit nights of incredible beauty and enduring bonds of friendship.

Again in a few weeks, as the Antarctic summer ebbs and the annual sunset begins over a barren white horizon of ice, the last flight will lift off, leaving 15 men and two women here to their own devices until next November. They will be unable to escape even for the most extreme medical emergency. Rustling leaves, falling rain and animals will all become foreign. There will be no new clothes, new movies or fresh food.

In such an environment, say psychiatric experts on isolation, seemingly minor personality quirks or even a slight change in the weather are magnified out of all proportion and can have unpredictable effects on the group's psychological well-being, and conflict flares easily.

For this reason, those volunteering to winter in the Antarctic are screened for personal idiosyncrasies like knuckle-cracking or other nervous habits that might be a source of irritation to others, according to Capt. Noel S. Howard, a psychiatrist with the Navy's Bureau of Medicine and Surgery who supervises the testing. He said the most important traits he looks for are "flexibility" and tolerance of other people's habits and beliefs.

Bad bets, he said, are those with any paranoid traits, excessive suspicion and those excessively dependent on external stimuli and rewards. "A person with some introverted qualities is better off than the glad-handing backslapping extrovert," he said.

## Radio Contact a Problem

Oddly, many say that having regular radio communication with home sometimes exacerbates the isolation, underscoring a feeling that the world is passing by. "So if a loved one runs off with the milkman, that person is stuck there," said Dr. Howard, who likened personnel at the Antarctic station psychologically to prisoners of war.

Whatever the psychological stress, this station can hardly be called a hardship post. The station is housed in three overheated orange-colored buildings snuggled under a 50-foot-high geodesic dome. The dome keeps out the snow drifts and wind, providing a pleasant and spacious environment in the floodlit area beneath it. There is a small gym, a room for weight-lifting, a Jacuzzi bath, a bar ("Club 90 Degrees South — We Never Close"), an excellent library and an extensive videotape collection ("The French Connection," "Patton," "M\*A\*S\*H").

The social center is the galley, decorated with murals of country lakes, where Merriann Bell of Keene, N.H.,

prepares sensational meals. For those wanting privacy, there is the Sky Lab Lounge, a small room at the top of a spiral staircase, warmly furnished with dark rugs and luxurious armchairs. Outside the picture window one can gaze at the bamboo stake that marks the exact bottom of the globe. It has to be moved each year because the ice has drifted about 30 feet, dragging the entire station with it.

## Many Scientific Personnel

Though the Navy does the screening, the entire winter crew belongs to the United States Antarctic Research Program, an arm of the National Science Foundation. Seven of the 17 are scientific personnel making observations of the weather, upper atmosphere and geophysical phenomena. The rest are support workers — a cook, engineers, mechanics, a doctor — employed by a private contractor, I.T.T. Antarctic Services Inc., of Paramus, N.J.

If the past is any guide, the group will soon form a divergent social system of its own, developing its own humor and jargon, and will divide into cliques. By most accounts, the 1981 winter was fairly successful despite some tensions.

The station leader, Tom Plyler, a tall, bearded, 32-year-old former Marine officer said he held weekly meetings to resolve problems and that alcohol use actually declined as the winter wore on.

Still it was not easy for Cynthia McFee, the lone woman. She is a lieutenant (junior grade) in the uniformed corps of the National Oceanic and Atmospheric Administration and she was running the South Pole branch of the agency's program on geophysical monitoring for climate change. Though she said he was not harassed sexually by the 16 men, she found it extraordinarily lonely without any other women.

## 'One of the Guys'

"I could never be one of the guys, no matter how hard I tried," she said. "Male camaraderie is a very powerful thing. Men and women think differently. No matter how great I was, I'd still never be accepted. This is when I was really lonely." She said she may have done better than other women because she was used to working in mostly male settings.

There is debate over whether women should be allowed to winter here. Shipwreck studies suggest that male-female combinations fare better psychologically, but the experience here is very mixed.

"It's hard enough for a group of men to be at this isolated spot without a member of the opposite sex, with the cold and the darkness," said Dr. Richard L. Cameron, manager of the science foundation's glaciology program. "Then you throw in one or two women and the group dynamics become very strange. It would be very difficult to

find the right mix. So all men or all women might be better."

Dr. Howard of the Navy said that ideally there should be at least three



# 'Sometimes You Want to Give Up Hope'

Following are excerpts from the diary kept by Andrew Cameron at the South Pole during the winter of 1979:

## Paranoia

I had quite a time one week this winter working at night and being so damn paranoid. It's like wearing headphones listening to music and someone creeps up on you and scares the pants off of you. I was afraid of somebody coming up behind me and scaring me while I was busily working on one of the shelves. I am told by other people who have wintered that many people will have their week of paranoia which will come and go without reason. The isolation seems to be an ideal place for unexplained fears to come out into the open until it is found that there really wasn't anything to be afraid of in the first place.

## Depression

Depression will come in lengths of time from a few hours to up to two weeks. If you have a very good working day and have a bad phone patch back home bringing bad news it is very possible to brush the whole incident off. But if the patch catches you have failed in a job or have lost friendship with someone, this might throw you deep into a state of depression which can last over a week.

Triggers of depression are hard to

find. Many are psychological triggers which are released for little or no reason. Dirty John will sometimes drop out of a conversation and depressed for no reason at all and have this last for 5 days. Life as we know it back in the states is so far away that sometimes you want to give up hope. You have a secret fear that since you are out of sight to friends and family that you are possibly out of mind.

## Alcohol

We are totally isolated without any contact with the outside world except for radio voice contact. The scenery never changes outside, as it is always extreme cold and hostile winds. So what is there to be done?

Why in the hell would anyone want to work in the Antarctic where there is nothing but a few heated buildings, lots of empty miles and millions of emergency problems. Well most everyone is running away from something. Usually their past life. A bad marriage. Lost loves are quite common. Some are hiding from the I.R.S. A few are even running from the law. A surprising number are running away from themselves. And while they are here alcohol soothes the pain and blots the memory of the running.

## Confusion

I am quite confused. Every morning I am glad that I am a day closer

to opening, but what will opening bring me. Returning to a dreary piece of countryside in a dismal time of the year to my broken family and few scattered friends. Here at the South Pole in addition to my isolation is the security that there is always plenty of food and lodging without payment. Entertainment is free and the splendors of the Antarctic night sky are a privileged sight. I will be heartbroken to leave and would love to stay but I have been here too long.

Although I am isolating myself in my sorrow I am still watching the station and day by day the atmos-

phere is getting hotter and hotter. Not from anger but from suspicion. Small groups of people refuse to let forth their secrets and each clique despises each other. The surface of the lake is smooth as glass but violence and biased hatreds are squirming in the deep preparing to surface.

## Gossip

With all subject practically worn out there is little left to talk about. Backstabbing. Condemning and criticizing somebody outside your group for trivial matters. Personality destruction was and is still quite common. One group will be backstabbing one person and when he walks in he joins the slaughter of somebody else's name and reputation. It's just a vicious circle.

women — "certainly more than one" — and that the whole question was under review. As for sexual relations, Dr. Howard said that all candidates were warned of the "dangers" of sexual liaisons under the supercharged conditions here. He said celibacy was the best course.

## 'Put It Out of Your Mind'

According to Dr. Shurley and others, the men think of nothing but sex for the first few weeks, then it is submerged until nearly the end of the winter. "You just basically put it out of your mind," said said Andrew Cameron, the author of the diary, who is Dr. Cameron's son. "You are working all the time; there is no privacy."

Indeed, he said, he was so preoccupied with station problems that he read only a dozen books. He said the first emergency came early in 1979, when a technician panicked after the last flight out had left. He was afraid that God could not find him if he died in the Antarctic, according to Mr. Cameron. Fortunately it was not too late to evacuate him.

There were other diversions, he said, such as the product of the "biological gardens," the marijuana patch that

produced "South Pole home grown." He saw little evidence of harder drug use, though alcohol abuse was heavy.

Psychologists say the best candidates for isolation are hard-working personalities, somewhat diffident, with higher than average intelligence and education, and without close family ties. Above all, they say, isolated personnel should be competent in their work, since criticism can be devastating in such confines.

## The 'Professional Isolates'

Probably the best bets are what Dr. Shurley calls "professional isolates," the kind of men who work on offshore oil rigs and Alaskan pipelines. Such men, he said, do not relate well to women and seem to thrive on isolation. They are definitely not homosexuals, but what Dr. Shurley calls "latent heterosexuals."

"Some of the people who are most gung-ho for this experience are not well adapted," said Dr. Cameron. "They tend to be misfits, seeking something they'll not find. And when the bubble bursts, their depressive experience is very difficult for others to handle. This is the big league of isolation."

As for Andrew Cameron, now living

in Gaithersburg, Md., he says it took him nearly a year to calm down from the winter. Toward the end he wrote in his diary: "I am sick of this chunk of ice. I want to get out of this cesspool. Let me get the hell out of here. I want to go home." Today he calls it "the greatest year of my life."

## British Survey Ship Returns Home From South Atlantic

LONDON, May 11 (UPI) — The survey vessel Bransfield sailed into Southampton today after a nonstop 8,000-mile voyage from the South Atlantic.

It was the first British ship involved in the Falkland Islands crisis to return home. The Bransfield was in the South Atlantic when the Argentines invaded the islands April 2.

On board the Antarctic survey vessel was its crew of 24 scientists, including four Falkland Islanders. The survey's deputy director, Ray Adie, said the ship was not scheduled to resume its work in the Antarctic until October.



## Denizens of the Beaufort Sea

by Ron Lovell

Five marine mammals call Alaska's Beaufort Sea home. And with interest in the area burgeoning, scientists are beginning to study their life cycles so that the animals can be protected in the course of exploration for oil and gas.

EXXON USA

FIRST QUARTER, 1982

OF THE SEVERAL MARINE MAMMALS commonly found in the western Beaufort Sea, the bowhead whales are the subject of the most controversy. Their plight is under constant discussion and study by various agencies of the United States and other governments, by the Alaska Eskimo Whaling Commission, and by oil companies such as Exxon Company, U.S.A. that seek to develop oil and gas resources in Alaska. Unlike the beluga whale, the walrus, the bearded seal, and the ringed seal—other denizens of the Beaufort—the bowhead whale was classified as an endangered species under federal law in 1970.

Bowhead whales have been protected from commercial whaling by the Convention for the Regulation of Whaling of 1931, and the International Whaling Commission (IWC) has recommended a ban on the commercial killing of bowhead whales since that organization was formed in 1947. The convention allowed for a harvest of bowhead whales by Alaska natives until the mid-1970's. In June, 1977, the IWC Scientific Committee recommended a quota of zero for the Alaska Eskimos. The IWC eventually relented and exempted Eskimos from the ban, establishing instead a quota comprised of two elements: whales actually killed and landed (45 for the years 1981, 1982, and 1983, with no more than 17 landed in any one year) and whales struck and lost (65 for the same years).

Yet neither the Eskimos nor the oil companies can be blamed for endangering the bowheads as a species. Their small numbers, now estimated at roughly 2,300, are the result of large-scale whaling that began in the 19th century.

By 1840, the New England whaling fleet had so reduced the number of whales in the arctic regions of the Atlantic that captains began to sail far afield in the search of whales needed to fill the demand for whale products. They rounded the tip of South America, and

working their way north, took the first Pacific or western bowheads in 1843 off the Kamchatka Peninsula in the Bering Sea.

Finding bowheads here was electrifying news to whalers; while all whales were valuable, the bowhead, so named for its strongly bowed upper jaw and distinctly shaped head, was particularly prized. A hundred barrels of oil could be extracted from the blubber of even a moderate sized bowhead. (One barrel contained 31 gallons of oil.) The creature's jaws would yield some 1,500 pounds of baleen—light, bony plates in the mouth used to filter food from the sea. The oil lighted the homes of America, and the baleen was turned into chair springs, buggy whips, skirt hoops, and corset stays.

Word spread of the new bonanza in the north. Yankee whalers penetrated to the Bering Strait by 1848. And in 1852 over 200 ships were operating in the area, despite the danger from ice that choked the waters and occasionally trapped and crushed the wooden hulls. By 1889, whalers had followed the bowheads to their summer feeding grounds in the eastern Beaufort Sea and adjacent Amundsen Gulf. The killing of bowheads continued into the first decade of the 20th century.

Happily, technology of a different kind overtook the commercial whaling industry itself. By 1915, the commercial hunt for bowheads had come to an end. Whale oil was driven from the market by crude oil extracted from newly discovered reserves in the earth. Likewise, the development of spring steel and changes in women's fashions ended demand for baleen.

Yet, the damage to the bowhead as a species had been done. An analysis of historical whaling records by John Bockstoce of the New Bedford Whaling Museum determined that more than 20,000 bowhead whales were killed by all vessels between 1848 and 1915. Where there were once many bowheads, now only a few remained.

According to one estimate, there might have been between 9,000 and 18,000 bowheads in the western arctic prior to whaling. Another estimate suggests there may have been as many as 28,000. No one can be sure because no scientific studies were conducted at the time. But it is certain that by 1915, the bowhead population had been reduced. One scientist estimates that perhaps 600 to 1,000 animals remained at that time; other scientists dispute these numbers.

With the whaling ships gone, Eskimos continued their traditional practice of subsistence hunting for bowheads. They do so today. Eskimos regard the hunt and related activities as an integral part of their culture.

Twice yearly, the bowheads pass near the Alaskan coast on their annual migrations. Having moved through the Bering Strait early in the spring, the pods go north and northeast through the Chukchi Sea. At Point Barrow, they head out to sea from the Alaskan shore, following opening leads well offshore in the central ice pack. They arrive in the early summer at Banks Island in the Canadian Arctic. Turning south, they forage and swim to the shore of the Canadian mainland. The pods then turn west in late August and early September. To avoid the impending freeze-up, they depart from Mackenzie Bay and follow the coastline westward. Proceeding through the Alaskan Beaufort Sea, they enter the Chukchi near Point Barrow and then turn westward to the Wrangel Island area, near the Siberian coast, where they remain to feed. Later, they move southward to pass through the Bering Strait and thence to their Bering Sea wintering grounds.

As the pods pass by, entire populations of tiny coastal villages turn out to capture a whale. Successful hunters drag the carcass onto the ice or beach in the fall and apportion the meat to community members according to formalized rules. The spring hunt in Alaska involves Eskimos of St. Lawrence Is-



land in the Bering Sea and settlements along the northwest Chukchi Sea. The fall hunt involves Eskimos of the Beaufort Sea coast.

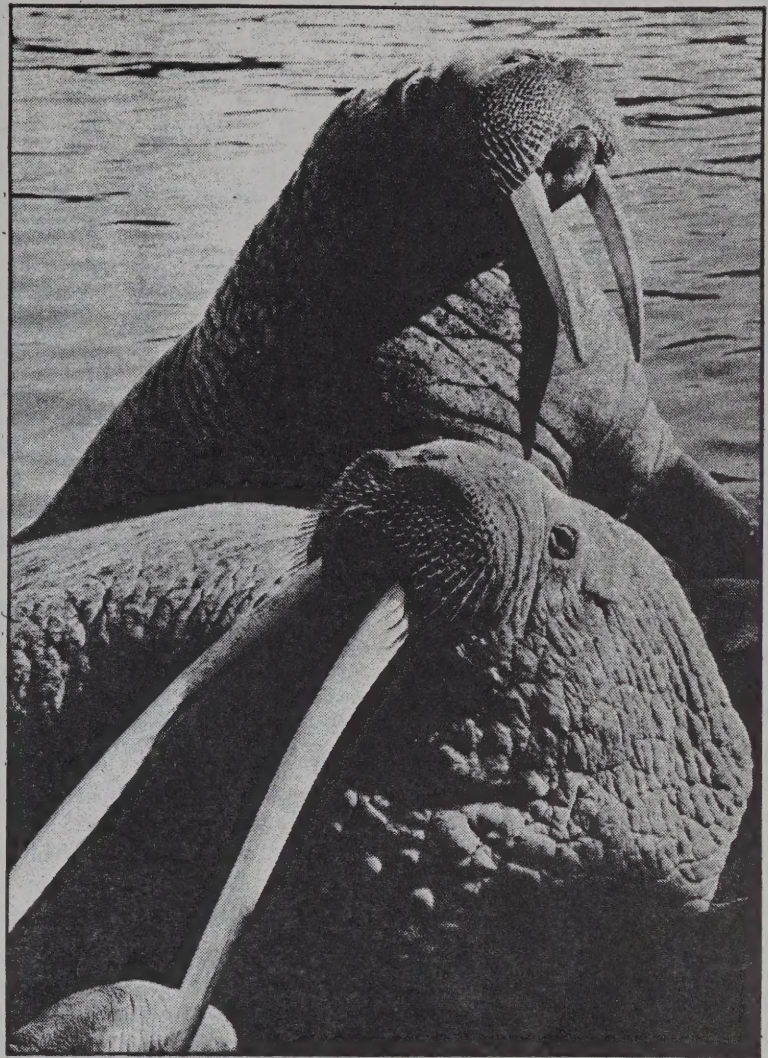
Of late, however, subsistence whaling has attracted international attention and concern. Noting the dwindling numbers of whales in the world's waters, many marine scientists encouraged the IWC's Scientific Committee to call in 1971 for more data on the arctic bowhead and the effect of the Eskimo hunt on its numbers. Accordingly, the National Marine Fisheries Service (NMFS), the agency with responsibility for the bowheads, gathered information on the scope of the Eskimo hunt and on basic harvest data. In 1973, scientists obtained biological samples from landed whales. They expanded their effort in 1976 to get an estimate of population size. Information on migration and distribution of the bowheads was obtained at the same time.

Although the NMFS has overall responsibility for bowheads, the Bureau of Land Management (BLM) became involved in 1978 because of the requirements of the Endangered Species Act. After preliminary consultations revealed a lack of information on bowheads, the BLM commissioned several organizations to study them.

At the same time, expanding exploration for oil and gas, encouraged by the discovery of the giant Prudhoe Bay field in 1969, brought a new dimension to the bowhead question. As ships, aircraft, and drilling equipment began to appear along the shores of the Beaufort Sea of Alaska and the Canadian Northwest Territories, would their presence affect the habits of bowheads adversely? Eskimos, in particular, demanded to know.

A major effort to answer these questions was mounted in 1980 and 1981, with particular attention devoted to the waters of Mackenzie Bay and the Canadian Beaufort, where oil companies had begun moving offshore as early as 1972. "We wanted to look into questions of acoustics and oil-related activity to determine if these cause visible changes in the behavior of whales," says Jerry Imm, field coordinator for environmental studies for the BLM in Alaska.

LGL Ecological Research Associates, with offices in Bryan, Texas, and Sid-



**Walrus are among the abundant marine life found along Alaska's coast**

ney, British Columbia, won the bid to conduct the research. Mark Fraker, a marine mammal biologist, took charge of the project. Joining in the study of bowheads were Bernd Würsig of the Center for Coastal Marine Studies at the University of California at Santa Cruz and Roger Payne of the New York Zoological Society. Their study, begun in the summer of 1980, continued through 1981.

Operating out of the tiny native village of Tuktoyaktuk on Kugmallit Bay in Northwest Territories of Canada, the group is attempting to do what no one has done before: to carry out a careful scientific study in the Arctic of these huge creatures that range up to 65 feet in length, weigh an average of one ton for each foot of length, and which, by their nature, elude the exacting observations that scientists require.

Bowheads are constantly moving and sometimes dive and remain submerged for as long as 20 minutes. Nor are they creatures of unvarying habit. Where last year the group saw literally hundreds of whales in their study area, this year, they found only a few dozen. The reasons are unknown.

"This is really stepping out on the cutting edge of science," says Imm, along on a flight with Fraker to look for bowheads. "It has never been done before in terms of method and technique."

Flying in a small airplane at an altitude of not less than 2,000 feet (to avoid alarming the whales), Fraker, Würsig, and two others, plus a pilot, go out daily to observe whales. Another team conducts sound experiments by boat while a third group observes from a shore station.

"When we see them we drop die



markers," says Fraker. "Then we circle, sometimes for an hour or two." Each observer wears earphones and a microphone connected to a tape recorder. Remarks are preserved for transcription and analysis later. Randy Wells, a graduate student from UC-Santa Cruz, takes notes on the comments and Peter Tyack, a Rockefeller University graduate student, videotapes the whales. Watching through binoculars, Fraker and Würsig carry on a running commentary about the behavior of whales and the overall pattern of their movement.

"Slaps tail on surface. Slaps it again and turns," says Fraker.

"'White Spot' is approached," says Würsig, giving a whale an identifying name.

"'Forward' is flipper flapping," adds Fraker. "Forward just lies at the surface and blows."

As the plane circles over the vast sea, time passes quickly. Sometimes bad luck intervenes.

"One day," recalls Würsig, "we found two whales and a calf and could have stayed for hours. After 50 minutes, the fog rolled in. That was that."

With little to compare their observations to, Fraker and Würsig point out that their conclusions at this point are limited. "We must establish what normal behavior patterns are," Fraker says, "before we can assess abnormal reactions."

For the past two summers, Fraker and his fellow scientists studied the relationship of bowheads and oil-related activity. They observed whales in the presence of moving ships and in the vicinity of man-made gravel islands built to support drilling rigs. In the summer of 1981, the group tried to measure the effects of industrial noise on whales by playing tape recordings of boat motors and other sound sources and recording results on sonobuoys. They are now evaluating their data.

"Whales apparently are more affected by boats than stationary islands," Fraker notes. "The mere physical presence of islands does not appear to cause them concern."

Are whales likely to be affected by such changes in their environment?

"Of course," says Fraker. "You accept there will be effects—perhaps positive,

perhaps negative, some small, some large. We don't know. That is what we are trying to find out."

Larry S. Underwood, a research analyst in animal biology at the University of Alaska Arctic Environmental Information and Data Center, who has observed the bowheads in Alaskan waters, confirms the absence of answers. "Our understanding of some things is good," he says, "but answers to such questions as why bowheads are even in the Beaufort and whether they will avoid it because of oil activities there or because food supplies shift elsewhere, we don't have."

So far, however, Underwood and other scientists at the center say they do not see any evidence of change in the distribution and abundance of any marine animal as a result of oil exploration.

observes. "They may be a long time coming. There may be a more obvious response if the level of activity should increase markedly. We can't really say." But one thing Underwood feels sure of: "We've got to try to get the oil out without upsetting the environment while doing it. The great challenge is to do both."

Along with the bowhead whale, several other mammals share the ice-choked waters of the western Beaufort Sea. The Arctic Project Office of the Outer Continental Shelf Environmental Assessment Program, at the University of Alaska in Fairbanks, identifies them as the polar bear, the arctic fox, the beluga whale, the ringed seal, the bearded seal, and the walrus.

The bear and the fox spend most of their lives on the polar ice pack, but return to land from time to time. The other four, though, are true sea creatures, living their lives in the marine environment. According to the scientists, all are faring reasonably well.

*Beluga whale* Also called white whales, these creatures are smaller than the bowhead, growing to a length of 15 feet and a weight of one ton. They migrate annually from their wintering area in the Bering Sea to the southeast Beaufort Sea in May and June. Belugas move through leads in the ice and reach the Mackenzie River delta in late June and early July. Some leave almost immediately, but the majority spends

the summer in the delta and in nearby Amundsen Gulf before moving westward again in August and September. At least 7,000 belugas arrive in the area and between 600 and 700 calves are born there. The hunting of belugas is an important summer activity for local natives in both Alaska and Canada. The whales provide winter food supplies and are as much a part of the culture of Canadian Eskimos as bowheads are to Alaskan Eskimos. The annual kill from the Mackenzie herd in Canada amounts to about 225 belugas, with perhaps 100 or so taken from the Mackenzie herd in Alaska.

Esso Resources Canada Limited has supported studies of beluga whales since 1972. Island construction, exploratory drilling, and related activities have had no detectable effect on whale distribution or pattern of use of the Mackenzie River estuary according to a study by Mark Fraker and his wife, Pamela, who is also an LGL scientist. A small amount of disturbance to the whales and Eskimo whale hunting has occurred, primarily from barge traffic. However, the effects have been kept to a minimum because Esso has restricted its activities in sensitive areas following the advice of whale biologists.

"We have observed white whales in shallow water areas reacting to barge traffic up to one-and-one-half miles away," says Mark Fraker. "We know that the whales stayed out of the disturbed area for at least three hours, although the whales had returned to a near-original distribution when we returned 30 hours later." Studies of underwater industrial sounds and the hearing sensitivity of the whales suggest that the animals are reacting to the sounds of boats and not to their physical presence.

As with the bowheads, little is known about the belugas. Observation of them continues annually.

*Ringed seals* Some 80,000 ringed seals live in the fast ice zone of the western Beaufort Sea. They spend much of the winter months feeding under the ice. Pregnant females establish lairs under the snow in March and April. Pups spend the first four to eight weeks of their lives in these lairs. The concern about effects of on-ice activity on ringed seals is that a female might abandon her pups if she is disturbed.



Without their mother's attention, the pups might die.

Their way of living also makes it difficult to study ringed seals. John Burns, a scientist with the Alaska Department of Fish and Game, is trying to add to knowledge about them. He and several colleagues are flying over areas of seismic exploration in a systematic way and recording changes in ringed seal abundance compared to an area where seismic work is not going on. The work has been slow and difficult. Some disruption of seals has been found. "Displacement can be tolerated up to the time pupping commences," says Burns. "Pups are born in snow dens and are sedentary after that." So that pups won't be disturbed, the United States Geological Survey sets a cut-off date of March 20 for seismic work carried out on the ice. However, companies that have not completed their activities may apply to the USGS for permits to continue beyond this time.

This year, Burns has designed a more elaborate program to be funded by the BLM. It will include the use of hydrophones to listen to the seals and the use of dogs trained to search out and locate the breathing holes through which air enters the dens. This will enable him to know more reliably the extent to which

on-ice activity displaces the seals, if at all. The dogs go on duty in 1982.

"Any intrusion of human activity into pristine regions is going to result in change," says Burns. "Whether it is positive or negative is the question."

**Bearded seals** So little is known about bearded seals that scientists are unwilling to estimate their total numbers in the Beaufort Sea. An estimated 3,000 bearded seals are said to live on the Canadian side of the Beaufort, but no precise estimate exists for the population in U.S. waters. The bearded seal is widely distributed and highly mobile. From birth, bearded seals live in regions of pack ice and can move at will. This allows them to escape disturbance, Burns explains. Numbers in the population present in the Beaufort Sea are lowest in winter. The majority of the animals live not in the Beaufort Sea, but in the drifting ice regions of the Chukchi and Bering Seas.

**Walrus** The current population of the walrus in the western Arctic is estimated at more than 250,000, according to joint American and Russian surveys. This number, considered by some experts to be larger than its environment can support, is up greatly from the era of commercial hunting that

began in 1860. By the early 1950s, the walrus population had dwindled to between 40,000 and 50,000. The creature has been alternately managed by the State of Alaska and the federal government since 1959. Hunting is largely restricted to natives, with a limited sport hunt permitted by the Alaska Department of Fish and Game. Average kills before a 1979 moratorium were around 10,000 a year. The federal government and the Alaska Eskimo Walrus Commission are currently working out a suitable management plan.

Walruses are not common in the Beaufort Sea, so effects of oil exploration on them are not likely to be great. John Burns sees a potential effect on them — perhaps favorable, perhaps unfavorable — should large offshore production facilities be erected in their Bering and Chukchi Sea habitat.

RON LOVELL

#### ABOUT THE AUTHOR

After a career as a writer and editor with a major news magazine, Ron Lovell settled on the Oregon coast to become a free-lance writer and teach journalism at Oregon State University.

## Two British explorers reach the North Pole

Associated Press

April 12

**London** — Two British explorers bade farewell to the North Pole and began the last and possibly most hazardous leg of their 52,000-mile journey around the world via both poles.

Sir Ranulph Fiennes and Charles Burton, who planted a Union Jack on their arrival at the top of the world Sunday, mounted their snowmobiles for the 600-mile ride to the edge of the Arctic Circle. They were expected to rendezvous in five or six weeks with a ship that will carry them home to England after nearly three years away.

The two set a record by crossing to the North Pole from the Canadian coast in 45 days.

In a message relayed by radio to the British Broadcasting Corp., Fiennes warned that hazards were now posed by ice breaking into floes due to unseasonably warm weather.

"Satellite pictures and aircraft have reported enormous areas of

open pack ice and sea normally frozen for another two months," he said.

"So we have got to race as fast as we can, hope that the winds which break up the ice stay away and that low temperatures which make travel very unpleasant indeed but which keep our chances open (to) continue."

Prince Charles, the expedition's royal patron who has called it "mad but marvelous," sent the explorers congratulations on their arrival at the North Pole, where they celebrated by sipping champagne in 26-degree-below-zero weather.

The explorers set out from Greenwich, England, on Sept. 2, 1979, crossed the Sahara in Land Rovers, sailed on the Benjamin Bowring to the Antarctic and snowmobiled to the South Pole, reaching it Dec. 15, 1980.

From the South Pole, they went to Australia, sailed to Los Angeles

and then up through the Bering Straits and the Yukon River to Ellesmere's Alert on Feb. 12. The \$36-million expedition was financed by contributions from 800 British firms.

### Permafrost map printed

**Washington** — The U.S. Geological Survey has printed a new map that highlights the major engineering problems caused by permafrost in Alaska.

Permafrost, or perennially frozen ground, underlies about 85 percent of the state. Road building and other construction can lead to thawing of permafrost and subsequent stability problems, including soil creep and landslides.

The map shows the known thickness of permafrost ranging from more than 1,300 feet near Point Barrow to less than a foot thick in the southernmost part of the permafrost region.



# Tracking the Giant Ice Cubes

By Andrew H. Malcolm

The New York Times

**T**HE AIRPLANE'S pilot, Lt. Frank Sturm, shouted over the roar of the plane's engines: "They're out there all right. The trick is to find them before they find someone. And this is a real busy year."

The objects of Sturm's search and of a multimillion-dollar annual hunt just resumed are icebergs, the frosty leviathans that lumber out of the north this time of year to threaten the busy North Atlantic shipping lanes.

With funds from a consortium of maritime nations, the United States Coast Guard annually assigns a long range patrol plane, a team of observers and at times a ship to monitor the southerly flow of icebergs along the Canadian coast toward a natural doom in the warm Gulf Stream currents.

From fog-ridden fields in Newfoundland, these teams fly out daily, equipped with special radar gear and computer charts and using sharp eyes, a dash of daring and a sense of humor to leaven long hours of monotonous searching for the deadly bergs that began life generations ago as innocent snow on Greenland's icecap.

Five months a year the crews radio reports to computers on Governors Island in the New York harbor to update twice-daily international broadcasts transmitted to ships to prevent a repetition of the Ti-

tanic disaster that claimed more than 1,500 lives in 1912.

The computers also hold area currents, and information on weather and temperatures to help predict the daily movement of each iceberg.

By mid-June the crews were monitoring more than 90 icebergs, equal to the number usually plotted as late as July.

**T**HE HIGH number was a result of the winter's lingering chill and the severity of winters two or three years ago when the current icebergs were "calved," breaking off parent glaciers on Greenland's western shore.

Some icebergs spend a year or two in their home cove before drifting into currents that carry them on a 2,000-mile journey north along the Greenland coast and then down past eastern Canada and Newfoundland.

"The water is colder this year," said Sturm, who is from Hopatcong, N.J. "So even the smaller bergs are lasting longer."

The iceberg the Titanic hit was probably of medium size, standing 50 to 150 feet above the surface, with a dark reef of ice reaching far out underwater.

Experts say icebergs can tower 300 feet high and can be more than 1,500 feet long, containing up to 1.5 million tons of ice, nine-tenths of it hidden below, moving at a speed of 15 miles a day.

The Coast Guard calculates that it would take 2.4 million gallons of gas or 1,

900 tons of TNT to melt or destroy a large iceberg. So destruction is left to the warm Gulf Stream, which does the job in two weeks.

Every morning in Gander, Newfoundland, weather and machinery permitting, Sturm boards an aging aircraft along with the two other ice observers, Petty Officers John Flynn of Voorheesville, N.Y., and Daniel Walsh of Syosset, N.Y., and a seven-member Coast Guard air crew from Elizabeth City, N.C. They cover an area of ocean the size of Pennsylvania.

Depositing their lunches in the plane's tail to chill, the crew prepares the special radars and sensors able to differentiate icebergs from fishing boats.

They closely monitor engine No. 4, which had a severe fuel leak the day before, causing an emergency three-engine landing. There are many jokes about handling the giant RC-130 in a severe spin and "blowing the jug," or crashing.

**T**HE PLANE IS flown high and fast to the southern fringe of the iceberg alley, to make sure none has sneaked through. In the rear of the noisy craft, Walsh is waiting and dozing until urgently awakened by Flynn, who as a prank is wearing a parachute.

As the plane begins its patrol, flying low-level patterns in the shape of inverted "U's," Andy Hampton, the radar operator, calls out the "targets," mostly ships.

"No two bergs are alike," he says. "But from up here they all look beautiful."

Everyone on the plane is wired together by intercom headsets. Technical jargon mixes with comradely bantering.

"We have a 34 DME lock on here," says the co-pilot, Allan Ferguson, meaning there is another plane 34 miles away.

"There are some big characters floating around out here," says Walsh, "in all shapes and sizes with the most beautiful shades of blue."

He must classify each sighting according to size. Even small ones, called growlers, only three feet above the water, can weigh 100 tons.

Just as the plane is to climb and head for home, Sturm calls out: "Ten o'clock, five miles out. Bingo!" The craft swings to the left. There, hugging the shore, is a small berg, three peaks of white and green ice sticking perhaps 20 feet above the water. The plane circles to get the correct coordinates for relay to New York.

"Well, that's one," says a somewhat frustrated Sturm. "At least we know today where a lot of icebergs aren't."

The 90-foot-long blue whale is the world's largest animal. Believed to be the largest animals that ever lived, blue whales eat by straining small animals from the water through comb-shaped plates in their mouths.



Large Tabular Iceberg is 75 feet high, 200 feet wide, and 400 feet long. Note pool of melt water in the center of the berg.



# Experts say U.S. needs arctic policy

The Anchorage Times Jan. 9

**Washington** — The United States should develop a comprehensive and coordinated arctic research policy as quickly as possible, educators and industry representatives agreed Friday.

The issue of arctic science policy was discussed by a panel of experts as part of the annual meeting of the American Association for the Advancement of Science here.

T. Neil Davis, a professor at the University of Alaska and a member of the Alaska Council on Science and Technology, said \$200 million is being spent each year on arctic research. About \$40 million of that consists of research at the University of Alaska, he said.

Davis and others criticized the duplication of effort between re-

searchers working for the state, the federal government and private industry.

"There is a hideous lack of coordination," said F. Geoffrey Larmine, general manager of the environmental control center of British Petroleum Co.

Larmine, who was manager of BP's Prudhoe Bay unit from 1947-71, called for greater "cooperation, communication and partnership... if we're going to make any progress at all."

Sen. Frank Murkowski, R-Alaska, has introduced legislation to establish a comprehensive Arctic research policy and plans to hold hearings on the issue early this year. In a paper presented to the symposium

by a member of his staff, Murkowski said the lack of such a policy now is "an example of bad economics and bad government."

Murkowski's bill would create an Arctic Science Council, consisting of the Secretaries of Interior, Defense and Commerce. The panel, which also would receive advice from the state, natives and private industry, would develop an arctic policy and serve as a clearinghouse for federal research efforts.

Research funding would accrue from a percentage of payments made to the federal government from the sale of federal oil and gas leases on the North Slope or the adjacent Outer Continental Shelf, under the Murkowski bill.

Albert W. Johnson, vice president for academic affairs at San Diego State University, said, "It is clear that the Alaskan arctic is important to the nation, for its energy resources, its wilderness values, its unique qualities and the presence of native groups."

Johnson outlined the key components of an arctic research policy:

— the establishment of priorities for arctic research.

— the assignment of responsibility to appropriate agencies.

— outlining a mechanism of coordination and cooperation.

— setting levels of research support which are consistent enough and predictable enough to enable long-term research to go forward.

— the location of one more research facility in the arctic.

— fostering of cooperation and sharing of information among nations with an interest in the arctic.

Also participating in the symposium were Vera Alexander, director of the Institute of Marine Science at the University of Alaska, Fairbanks, and David M. Hickok, director of the Arctic Environmental Information and Data Center, University of Alaska, Anchorage.

## Scientists debate migration dates

Associated Press

**La Jolla, Calif.** — A Canadian archaeologist has fueled the debate of when the first settlers appeared in North America, saying humans may have crossed the Bering Strait as long ago as 120,000 years.

"The timing of entry and subsequent spread of early peoples into the New World... is a (subject of) continuous debate," Brian Reeves of the University of Calgary acknowledged Tuesday in a paper presented at a symposium on human migration and undersea archaeology.

In a separate presentation, a Soviet scientist argued his nation's experts believe the migration could have begun as long ago as 70,000 years.

But Reeves said evidence indi-

cates man was on the move across the Bering Strait during an ice age more than 100,000 years ago. Earlier, he said, the ice age sucked up water from the sea, creating ice bridges and dry areas.

As long as 120,000 years ago, he said, man could have moved southward into North America through at least four corridors.

A generally accepted theory has been that man entered the Americas across the Bering Strait about 13,000 years ago, but possibly as long as 25,000 years ago.

Dikov Nikolai Nikolayevich of the Soviet Union's Scientific Research Institute said studies from his side of the Bering Strait indicate the human occupation of Beringia may have occurred in stages.

He said the stages were 70,000 to 50,000 years ago, from 27,000 to 10,000 years ago, and from 14,000 to 13,000 years ago. He gave no dates for a fourth, more recent stage.

The tools used by these ancient people uncovered on the Kamchatka Peninsula of Siberia resemble those found at sites in the northwestern United States and even those of the San Dieguito Indians of the Southwest, Nikolayevich said.

David Hopkins of the U.S. Geological Survey in Menlo Park, Calif., said he believed "the Bering land bridge was probably in existence during most of the period between 80,000 and 14,000 (years) before present."

## Massive sealift prepares for voyage north

Associated Press

**Fairbanks** — The largest shipment since 1976 will head north from Seattle in mid-July in the 15th annual sealift to equip oil companies operating on Alaska's North Slope.

Fifteen barges, each 400 feet long, will haul 80,000 tons of oil and gas exploration and production equipment, according to Crowley Maritime which is handling the sealift.

Eight tugs will tow the barges. The ice-breaking barge Arctic Challenger and the Arctic Salvor, a salvage vessel, will accompany the armada on its 3,000-mile voyage.

The fleet must catch a narrow window of a few weeks when the Arctic Ocean icepack pulls away from the shore enough to allow the barges to get into Prudhoe Bay. Deliveries also are scheduled for the Kuparuk field to the west which went into production during the winter.

Sohio Alaska spokesman Frank Baker said 66 modules are under construction at four shipyards in the San Francisco Bay area. They will be barged to Seattle to rendezvous July 15 with barges carrying 57 modules for ARCO Alaska Inc.

## UAF agrees to conduct arctic marine research

The University of Alaska, Fairbanks has entered into a special agreement with the National Oceanic and Atmospheric Administration to conduct cooperative research on marine pollution in the arctic.

Under the agreement, UAF will provide the agency with evaluations of management strategies for environmentally sensitive shelf, coastal and near-shore areas, and the estimated impact of human activity on these areas.

The primary goals of the agreement are to improve the understand-

ing of Alaskan coastal marine and continental shelf areas, including the high arctic. It also seeks to better predict changes induced by human use and to allow management of the area that conserves its multi-use character.

UAF Chancellor Patrick J. O'Rourke said the administration "initiated the request with UAF while politely declining requests from other universities." He called that an endorsement of the research activity and quality of the science at UAF.

## Reserve in Arctic set

**YELLOWKNIFE (CP)** — Parks Canada and the Government of the Northwest Territories have signed an agreement to establish a national park reserve in the high Arctic. The proposed 37,555-square-kilometre reserve is to be located on northern Ellesmere Island and will include the most northerly lands in Canada. The area includes mountain ranges, glaciers, ice shelves, fiords and Lake Hazen, the largest lake north of the Arctic Circle.



# In Canada's North, Ice Is a Brutal Fact of Life

By ANDREW H. MALCOLM

The New York Times

**WELLINGTON CHANNEL, North-west Territories** — It is everywhere in Canada's North, an integral element dominating life like dirt on a farm or cement in a city.

It is ice, an entire white continent sitting atop the world, growing, shrinking, shifting, cracking and thickening for 52 weeks every year.

For 99.74 percent of Canada's population, ice is something to drop in drinks or sprinkle salt on in the driveway. But for the 63,000 other Canadians, ice is a brutal fact of everyday life.

The frozen surface of the Arctic Ocean forms playgrounds, race tracks, airfields, work platforms, scientific outposts and natural highways and hunting grounds for both man and animal.

Cut in certain ways by skilled hands, ice makes a handy homemade refrigerator to hold freshly killed game until spring, which comes by June, or it can become an instant, life-saving shelter against the vicious winds that blast back and forth across the Arctic and freeze flesh in an instant.

Yet very quickly those same winds can seize the ice that offered a safe route home and turn it into a groaning, twisted jumble of pressure ridges riven by open lanes of water or thin layers of white snow masking chasms of salt water slush that swallow unsuspecting victims in seconds.

"The great constant up here," Dr. Joseph B. MacInnis said the other day as he stood on top of 340 feet of water and 64 inches of pale green ice, "is the ice, that marvelous menace that is so lethal and so helpful at the same time. We have to learn to cope with it better, and to use it better."

Dr. MacInnis, a Toronto physician with an interest in scientific studies under the Arctic ice, had flown here on a day trip by helicopter from the nearby settlement of Resolute to investigate the prospects of setting up a research camp on the ice of Wellington Channel between the two Arctic islands of Cornwallis and Devon.

One of the few Canadians who see their vast North as a unique environmental heritage, Dr. MacInnis preaches the Arctic to his countrymen with a missionary zeal and has made scores of dives beneath the ice.

"There are over five million square miles of Arctic Ocean," he said. "It is a whole continent of ice. And man has seen only a few city blocks of it."

The hunt for oil and gas is now exposing Canadians to more of it. Using thickened sea ice as floating drilling platforms, exploration crews are piercing the Arctic Ocean's depths. And planners expect icebreaker tankers to crunch their way routinely through the Northwest Passage with loads of liquefied natural gas by 1990.

No one knows yet what impact such regular movement will have on the Arctic,

where summertime footsteps or tire marks on the tundra can last for decades. For instance, what would be the effects on the Arctic, its ice, its wildlife and even the world's other oceans if there were to be a major oil spill or well blowout in the Arctic some day.

The Eskimos have learned over thousands of years to use the frozen surface. They have words for different kinds of ice and, like prowling polar bears, they know where seals build their homes in the underwater ice crevices and where they put air holes. The Eskimos know that salt gradually leaches out of old ice, so they can find drinking water almost anywhere.

Oil exploration companies, too, now use the ice rather than fight it. Using crossed logs and water spray guns, they build ice bridges. They also carve holes in the ice at an ocean drill site and pump up sea water, letting it seep for many days across perhaps a square mile area in temperatures that hover around 40 degrees below zero.

The thin layers of water freeze atop each other, eventually creating an upside-down dome of ice 25 feet thick with enough buoyancy to carry a 5.5 million pound drilling rig until, piece by piece, it is trucked away on an ice highway or flown out on giant cargo planes landing on ice runways.

## Northwest Passage charts may open seaway

**SAN DIEGO (AP)**—A sea route as treacherous as any in the world is being charted painstakingly from Alaskan oil discoveries directly to the Atlantic Ocean—an icy Northwest Passage of which explorers dreamed for centuries.

It is the dream also of U.S. and Canadian oilmen who've hoped for years to send tankers in a relatively inexpensive passage through the Arctic Ocean.

"We see success for charting the entire 3,000 sea miles by 1985, far sooner than we used to think," said James A. Vosburgh, senior hydrographer for Canada's Institute of Ocean Sciences.

The critical charting of the Beaufort Sea's shoal-filled waters is 52 percent complete along a path 10 miles wide and 170 miles eastward from the oil discoveries of the Alaskan North Slope, Vosburgh said in a telephone interview.

Canada's oil-sensitive environment "must be protected at all costs," said Vosburgh.

In mid-July, with the earliest ice thaw, he and about 20 fellow scientists will head west from Victoria Island in the Canadian Arctic on a research ship complete with three launch boats and tiny computers that can detect danger.

A route paralleling the Tuktoyaktuk peninsula is being laid out about 60 miles offshore but "traditionally we must return about mid-September since the weather is impossible for all but two months every summer," Vosburgh said.

The hydrographers, whose work is paid by the Canadian government through the Department of Fisheries and Oceans, believe "the positioning system carried on each boat has stepped up our progress immensely," he said. Known as ARGO, it is a compact, 90-pound device which requires relatively little power.

According to Cubic Western Data of San Diego, producer of the ARGO for Canada, the device tracks as many as a dozen boats simultaneously up to 400 miles away, enabling hydrographers to work from shoreline stations and over the horizon to ships at sea.

A consortium of U.S. oil firms converted the 150,000-ton tanker Manhattan into the world's largest icebreaker in 1969 after nine billion barrels of oil was discovered under the North Slope. But even that armored sea tank nearly met disaster.

The Manhattan, aided by a conven-

tional Canadian icebreaker, battered its way to Alaska in the summer of 1969 and returned with a symbolic barrel of Prudhoe Bay crude. However, the Manhattan reportedly passed within a half mile of an unsuspected shoal, and industry analysts concluded crossing the Arctic was too dangerous.

Additional hazards are posed by sea-mounts such as the pingo, a commonplace conical hill with an icy core, pose serious threats even in summer.

In the Beaufort Sea alone, scientists say sea-mounts with pingo-like features known as PLFs cover nearly 10,000 square nautical miles—a body of water larger than the state of Maryland. They rise 150 feet above the surrounding seabed, some on bases miles in diameter.

Sonar failed to detect them accurately so the Canadian government required parallel sounding lines 300 feet apart.

There is no question, they say, but that a Northwest Passage directly to refineries on America's East Coast and Gulf of Mexico would be a bonanza.

But first one of the world's most hostile environments must be conquered.



# Soviets look for oil in arctic seas

**The Anchorage Times**  
Tulsa, Okla. — The Soviet Union has launched its first offshore arctic drilling campaign with slim prospects that significant extreme northern hydrocarbon production will be achieved this decade, Oil & Gas Journal reported in this week's issue.

Indications are that the Soviet Union will use the remainder of the 1980s to try to confirm geologists' predictions of big oil and gas resources on the nation's western arctic shelves, the weekly business magazine said.

Russia appears confident that by the 1990s it will have gained enough experience working in non-arctic offshore ice conditions to tackle Barents and Kara Sea field development with or without direct foreign assistance.

The Soviet Union's first arctic offshore wildcat well is being drilled near the Arkhangelsk Province coast of the Pechora Sea, a southeastern arm of the Barents Sea. A 16,400-foot test is under way in shallow water from a Soviet ship converted into an ice-resistant fixed platform.

More ambitious Soviet offshore arctic exploration is to get under way soon. Russia planned to begin work this winter in the Barents Sea with its first Finnish-built drilling ship, the Valentian Shashin, but delays have been encountered.

Two similar dynamically positioned arctic drillships, of IHC Holland Pelican design, are being built for the Soviets by Rauma-Repolas Mantyluoto Works at Pori on the Gulf of Bothnia. Both units are slated for completion by the end of the year.

Moscow hasn't disclosed where the drillships will work in the Barents Sea. But it appears likely that, after thorough testing in southern Barents waters, at least one of the rigs will be assigned to the high arctic near 80 degrees north latitude, the Journal said.

The Soviet Union may try to drill stratigraphic tests near the Spitsbergen (Svalbard) Archipelago before agreement is reached on the disputed Norwegian-Soviet Barents Sea demarcation line. This line is now shown running just east of Spitsbergen.

Feb. 24

## Yevgeny Fedorov, Aged 71; A Major Soviet Geophysicist

MOSCOW, Jan. 2 (Reuters) — Yevgeny K. Fedorov, one of the Soviet Union's leading geophysicists, died Wednesday, Tass, the official press agency, reported today. He was 71 years old.

Dr. Fedorov, who was director of the Institute for Applied Geophysics at the time of his death, was known for his extensive research into climatic conditions in the earth's polar regions and was also associated with his country's space program.

### Headed Weather Service

Dr. Fedorov was head of the Hydrometeorological Service, the Soviet weather bureau, from 1939 to 1947 and from 1962 to 1974. In the intervening years, he was associated with the Geophysics Institute of the Academy of Sciences until 1955 and then set up and headed his own institute of applied geophysics. In 1974 he returned to head the institute.

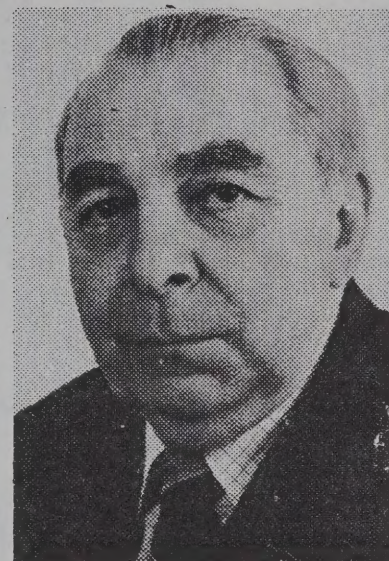
As head of the weather service, he was the official Soviet signer of an environmental cooperation pact with the United States in 1972. The pact, which included a provision for joint research into forecasting earthquakes, was seen then as possibly opening a door to cooperative research into detecting underground nuclear explosions.

Dr. Fedorov headed a Soviet delegation to technical talks on a nuclear test ban treaty from 1957 to 1959 and was regarded as a leading Soviet expert on the technical problems of detecting and identifying underground explosions.

### Worked at Polar Station

He was involved in polar magnetological research in the 1930's and worked as a geophysicist and astronomer at the first Soviet polar drift-ice station, called North Pole I, in 1937-38.

In 1972 Dr. Fedorov was a member of a United Nations scientific committee



Camera Press

Yevgeny K. Fedorov

on outer space, and he was involved in deliberations on Canada's complaint about a Soviet satellite that fell from orbit and scattered radioactive debris on Canadian soil. Canada had called for an investigation into new safeguards on the use of nuclear power in spacecraft. Dr. Fedorov objected, saying that the use of nuclear energy aboard satellites was justified by the scientific benefits and that additional safeguards were unnecessary.

Yevgeny Konstantinovich Fedorov — the name can also be rendered Fyodorov — was born in Bendery, Moldavia, on April 10, 1910, and was graduated from Leningrad University in 1932.

Among his official honors, he held the title of Hero of the Soviet Union and was a five-time recipient of the Order of Lenin.

## Eskimos Allowed to Kill 19 Bowhead Whales

ANCHORAGE, March 1 (AP) — Eskimo whalers along Alaska's west and north coasts will be allowed to harpoon 19 endangered bowhead whales this year under an agreement between Federal officials and the Alaska Eskimo Whaling Commission.

The agreement, reached Sunday, is an extension of a pact signed last year allowing Eskimos to manage their own hunts, with technical assistance from the National Oceanic and Atmospheric Administration.

Federal observers will be stationed in whaling villages to monitor the annual hunt, said Bob McVey, Alaska regional director of the National Marine Fisheries Service.

The agreement comes only days before the expected beginning of the 1982 bowhead season. It falls within limits set in 1980 by the International Whaling Commission, which permits Eskimos to strike, or harpoon, up to 65 whales and land 45 in the 1981, 1981 and 1983 seasons combined.

### Giant ice cap

BOSTON (AP)—The world's largest island is Greenland, located about 1,800 miles north of here. An ice cap, two miles thick in places, covers the island.

If the ice cap were removed, you would see a ring of mountains surrounding a lot of water. The center of Greenland, about one-third of the land area, lies more than 1,000 feet below the surface of the sea.



# SIR DOUGLAS MAWSON CENTENARY – 1982



The centenary of the birth of Antarctic explorer, Sir Douglas Mawson (1882-1958), is to be commemorated by two Australian Antarctic Territory stamps to appear on 5 May 1982.

The two stamps, designed by Mr Ray Honisett, show portraits of Sir Douglas Mawson. On the 27c stamp Mawson is shown before a bleak Antarctic vista, while on the 75c stamp he is seen with a map of the Australian Antarctic Territory.

Sir Douglas Mawson was born at Bradford, England, on 5 May 1882 and came to Australia at the age of four.

Mawson was a brilliant student, and while studying at the University of Sydney was befriended by the eminent geologist, Professor Sir William Edgeworth David. Together they were invited to join Sir Ernest Shackleton's British Antarctic Expedition of 1907-09.

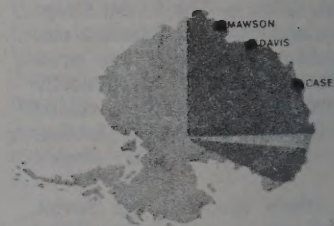
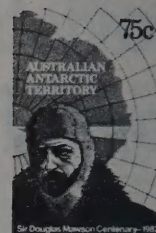
Mawson and Edgeworth David both participated in two notable achievements while with the expedition. In company with Dr A. F. Mackay they were the first to scale Mt Erebus, Antarctica's active volcano, and they were also the first explorers to reach the South Magnetic Pole.

Mawson returned to Antarctica as leader of the Australasian Antarctic Expedition of 1911-14. The expedition mapped more than 1500 km of Antarctic coast and established stations at Macquarie Island, Commonwealth Bay and Shackleton Ice Shelf. He almost lost his life when, on an inland journey of exploration, one of his companions was lost in a crevasse and the other died of disease. Alone, Mawson trekked 169 km in a fifty-seven day feat of endurance and almost perished when he, too, fell into a glacial crevasse. For his achievements, he was knighted and awarded the King's Polar Medal.

Sir Douglas Mawson commanded the 1929-31 British-Australian-New Zealand Antarctic Research Expedition (BANZARE). Once more he was to explore an area of previously uncharted Antarctic coastline. In the course of that exploration he discovered and named MacRobertson Land after Sir MacPherson Robertson, a principal donor to the project.

When, following the Second World War, the Australian Government formed the Australian National Antarctic Research Expeditions (ANARE), Sir Douglas Mawson was co-opted as adviser on planning. The expeditions established research stations at Heard and Macquarie Islands and, in 1954, established the first permanent ANARE station on the Antarctic mainland. The station was named "Mawson" in honour of the man who had contributed so much to the knowledge of the continent.

Sir Douglas Mawson died in Adelaide on 14 October 1958 and was given the rare honour of a State funeral.



AUSTRALIAN  
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